CHANGEABLE MESSAGE SIGN (CMS) USAGE PROCEDURE
Executive Summary

Changeable Message Signs (CMS) are a direct information link between VDOT and motorists. CMS messages must relay meaningful information to motorists concisely and quickly. Messages must be timely, reliable, and accurate for that time and location. Ultimately, the success of CMS depends on motorists' belief in the information being displayed. Improper usage or incorrect information will erode motorist confidence and reduce overall sign effectiveness.

To date, VDOT has had few statewide CMS procedures. Public service announcements were explicitly prohibited; otherwise, users had the freedom to utilize the signs for any purpose they felt was justified. This created confusion and a general misunderstanding about the signs' original purpose: providing en-route travel information while managing traffic.

This CMS procedure was developed to provide a measure of statewide consistency. Research documents, user comments, and national experience were utilized in developing this procedure. It is applicable to both permanently mounted CMS as well as portable or trailer-mounted CMS that are operated on VDOT maintained roadways.

This procedure does not provide guidance on how to create messages, concepts of operations, CMS design, or specific wording. Each District is responsible for establishing those guidelines and conducting related training. This document is intended to create uniformity in CMS usage across Virginia. The following is a basic list of acceptable and unacceptable uses. Readers are encouraged to reference the procedure for more details.

Acceptable CMS Usage
- Blank Signs
- Traffic Incident Situations
- Construction and Maintenance Activities
- Display of Future Roadwork
- Adverse Weather, Environmental, and Roadway Conditions
- Other Sources of Traveler Information
- Special Events
- Display of Future Special Events That Adversely Affect Travel
- Display of Travel Times
- Displaying Messages for Other States or Transportation Agencies
- Emergency Messages
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- Advertising
- Public Service Announcements
- Routine Congestion Messages
- Contact Information
- Date/Time
- Static signing

CHANGEABLE MESSAGE SIGN (CMS) USAGE PROCEDURE

1.0 Introduction

Changeable Message Signs (CMS) are an important resource for the Virginia Department of Transportation (VDOT). These signs are a direct information link between VDOT and motorists. Ultimately, the success of CMS depends upon the motorists' belief in information being displayed. Improper sign usage or incorrect information will erode motorist confidence and reduce overall sign effectiveness. Therefore, VDOT has developed this procedure for the use of CMS on VDOT maintained roadways within the Commonwealth of Virginia.

Changeable Message Signs (CMS), Dynamic Message Signs (DMS), and Variable Message Signs (VMS) offer very subtle differences. In practice, these terms have become interchangeable. For the purpose of this document, the term CMS is used, and defined as a programmable traffic control device that can usually display any combination of characters to present messages to motorists.

Numerous CMS technologies are currently utilized throughout Virginia. These instructions are intended to be technology independent. No matter the sign technology, this procedure shall be in effect and applicable to both permanently mounted CMS as well as portable or trailer-mounted CMS located or operated on VDOT maintained roadways.

This document is intended to create uniformity in CMS usage across Virginia, yet provide flexibility for local needs. For some areas of the state, this procedure may provide ample direction on the use of CMS. Other areas may feel a need to better develop CMS guidelines (i.e. acceptable wording, CMS response times, display characteristics, etc.) VDOT District offices are encouraged to develop local or regional CMS guidelines to address such needs. All locally developed guidelines, however, must adhere to this statewide procedure.

CMS messages must quickly relay concise and meaningful information to motorists. Basic CMS message content should include the "what" (situation the motorist will encounter), "where" it is located, and an "action" the motorist should take. Situations will arise when a CMS could be used for two or more situations at the same time. The CMS operator should display the higher priority message based on proximity of the sign to the event, volume of traffic potentially affected, and reliability of the information.

This document has been developed to give CMS users clear instructions on acceptable and unacceptable uses. Numerous sources were used to develop these procedures including:

- The *Manual on Uniform Traffic Control Devices* (MUTCD)
- The *Virginia Work Area Protection Manual*
- Several FHWA reports and directives
- VDOT user comments
- Studies conducted by noted researcher; Dr. Conrad L. Dudek, Texas A&M University.

The office of the VDOT State Mobility Management Engineer shall make any updates, exceptions, or revisions to this procedure.

2.0 Responsibility for Operation of CMS

VDOT personnel shall oversee the operation of CMS on roadways under its jurisdiction. Within VDOT Districts where a 24-hour/7-day Smart Traffic Center (STC) is present, the STC shall have full operational control of all permanently mounted CMS within that District; except special facilities, such as tunnels, weigh stations, where the special facility operations center may control CMS specifically related to that facility.   In Districts without a full-time STC, the VDOT District Administrator shall assign responsibility. Regardless of who is assigned this operational responsibility, 24-hour/7-day control shall be maintained, and authorized users must be trained to ensure that proper messages are displayed. VDOT will work with law enforcement personnel to post messages for given traffic and/or highway situations.

Any use of CMS within VDOT right of way shall adhere to this procedure. VDOT shall be notified prior to any such use.

3.0 Inoperable Signs

VDOT staff will make every effort to keep CMS operational at all times. If any permanent CMS becomes inoperable, a portable CMS may be used until the permanent sign becomes operational.

If a permanent CMS is expected to remain inoperable for longer than fifteen (15) days, a static sign may be installed notifying motorists of the inoperable condition. This provision also relates to new CMS that are physically installed but not yet under VDOT control.

4.0 Acceptable CMS Usage

Credibility is the foundation upon which any successful CMS program is built. Motorists must be able to easily recognize, read, and comprehend CMS messages. Messages must be timely, reliable, accurate, and relevant to motorists at that time and location.

VDOT has established acceptable CMS uses to provide for statewide consistency in order to improve motorist expectations on the accuracy of the information about traffic conditions or travel efficiency throughout the Commonwealth.   The remainder of this section details acceptable uses of CMS in Virginia.

4.1. Blank Signs

A blank sign shall be viewed as a valid message, "telling" motorists that there is no unusual travel information to relay. Conditioning motorists to this use of signs provides the greatest potential for driver compliance. Unless a CMS is displaying a message in accordance with this Section, the sign shall remain blank.

4.2 Traffic Incident Situations

One of the most important uses of CMS is alerting motorists to lane closures due to traffic incidents. Within these instructions, a traffic incident will be defined as any unexpected situation that reduces roadway capacity.

Any traffic incident is acceptable for a message. However, no message should be displayed if the sign is such a distance away from the affected area that full capacity is restored before motorists reading the sign would be impacted. Conversely, if the incident is confined to an adjoining route and motorists reading the sign would be affected, a message should be displayed.

Depending on the location, severity, and duration of the incident, messages may be displayed several hundred miles in advance of the scene. Should a situation arise whereby multiple incidents are downstream from a sign, CMS shall alert motorists to the closest incident unless conditions warrant otherwise.

4.3 Construction and Maintenance Activities

CMS have a wide variety of uses for temporary work zone applications. Example situations include, but are not limited to, the following:

- Lane and/or shoulder closures
- Lane width restriction
- Roadway or ramp closures
- Areas of significant queuing or delays
- Changes in roadway alignment or surface conditions
- Changes in traffic patterns
- Detours/alternate routes
- Advance notice of new traffic control devices

The current edition of the *Virginia Work Area Protection Manual* shall be referenced for proper use of the CMS in work zone applications. CMS shall not be a substitute for devices required by the *Virginia Work Area Protection Manual*.

4.4 Display of Future Roadwork

Traffic-related information that provides advance notice of future roadwork requiring lane closures may be displayed, but shall be replaced by current information whenever applicable. Advance notification should not be given more than six (6) days prior to the roadwork. Days of the week (e.g., *TUES-FRI*) shall be displayed. Calendar dates (e.g., *SEPT 25-SEPT 28*) are discouraged, but may be used in the message. Advance notice messages have lower priority to messages that impact the safety and operation of the roadway.

4.5 Adverse Weather, Environmental, and Roadway Conditions

CMS may be used to display adverse weather, environmental, or roadway conditions. Information must be confirmed either from personnel on-scene, roadway weather data, or the National Weather Service. In general, weather information should be <u>location specific</u> and not readily apparent to motorists. Proper messaging may include fog, flooding, major snowstorms, icy roadway, high cross winds, and severe weather warnings. CMS may also be used to advise of specific recommendations due to the weather or roadway conditions (e.g., tire chains or snow tires).

4.6 Other Sources of Traveler Information

Motorists only have a brief period of time to read and understand CMS messages. If extensive travel information must be conveyed, CMS should refer motorists to Highway Advisory Radio (HAR), 511 Virginia and/or local media. No CMS messages shall be allowed to <u>solely</u> promote a traveler information service.

4.7 Special Events

CMS may be used to help alleviate major traffic problems generated by special events (e.g., sporting events, festivals, auto races, graduations, etc.)   Because VDOT prohibits the display of advertising messages on any CMS, messages related to special events shall only use generic terms describing the event and be approved by VDOT.

CMS usage of this type must be coordinated with the event organizers. Furthermore, CMS operators must remain available for contact with on-scene personnel to ensure message accuracy. This is especially important when CMS are used in conjunction with alternate route/parking strategies.

CMS may be used to inform drivers of other transportation opportunities for visitors to the special event (i.e. shuttle parking).

CMS messages may also advise through-drivers of adverse traffic conditions created as a result of special event traffic or conditions, or to reroute.

4.8 Display of Future Special Events That Adversely Affect Travel

CMS may be used to relay traffic-related information in advance of future special events that will adversely affect travel (e.g., concerts, auto races, festivals, etc.) or that require closing streets or highways (e.g., parades, bike races, marathons, etc.)   Advance notification should not be given more than six (6) days prior to the event. Days of the week (e.g., *TUES-FRI*) shall be displayed. Calendar dates (e.g., *SEPT 25-SEPT 28*) are discouraged, but may be used in the message. Advance notice messages have lower priority to messages that impact the safety and operations of the roadway.

4.9 Display of Travel Times

An evolving use of CMS is to display the travel time from the CMS to a given point downstream. Regular users of that section of roadway will then be able to judge the level of delay. Travel time information may be displayed if times can be measured or calculated directly using data from freeway sensor equipment, cell phones, toll tags, or other technology. To ensure accuracy, travel time information should be displayed automatically as manual entry may be impractical and error-prone.

4.10 Displaying Messages for Other States or Transportation Agencies

CMS may be used to display traffic-related messages for other transportation agencies. It is acceptable to display messages about traffic conditions in neighboring states if the information is credible. The priority for displaying messages shall remain in the control of VDOT. All efforts must be made to keep the information current and accurate.

4.11 Emergency Messages

CMS may be used in times of emergency to convey critical information. Messages related to homeland security and AMBER Alerts are two such emergency situations. Regardless of the emergency, sound CMS policies and practices must be followed. CMS advisories shall provide sufficient yet concise information while ensuring safe and efficient traffic flow. Messages must be transportation related or convey specific emergency conditions that require motorist action. All emergency messages must be coordinated through VDOT's Transportation Emergency Operations Center (TEOC), who will help determine the geographic area over which the message should be displayed, and the period of time to display the message.

Priority for displaying messages shall remain in VDOT's control. Specific wording shall also remain in VDOT's control, although close coordination with emergency personnel is strongly encouraged. If extensive emergency information must be conveyed, CMS should refer motorists to 511 Virginia, HAR or local media.

The "AMBER Alert" plan is a valuable tool used to help law enforcement agencies protect our children. The Virginia "AMBER Alert" plan has been developed to include VDOT assistance in order to provide valuable information to motorists. Activation of Virginia's "AMBER Alert" Plan must be initiated through the Virginia State Police (VSP). VSP will contact VDOT's TEOC, who will coordinate CMS usage for the event. Only CMS messages that follow this chain of authority will be allowed.

4.12 Ozone Advisory Messages

Ozone forecasts are issued on hot summer days for most of Virginia. From May through September, these forecasts are available Monday through Friday afternoon for the following day. On "Code Red" days and the prior afternoon, VDOT will support this effort in declared areas, by displaying messages that will advise motorists of the air quality condition, and promote strategies to reduce vehicle emissions. Ozone advisory

messages have lower priority to messages that impact the safety and operation of the roadway.

4.13 Safety Campaigns

CMS messages related to traffic/driver safety campaigns may only be displayed as supplements to specific national or statewide traffic/driver safety media campaigns on the same topic. Message wording must clearly relate to the applicable campaign. The campaign should be less than two (2) weeks. The total duration of any such safety message should not exceed two hours per day at any CMS location, and should not be displayed during peak travel periods. Safety campaign messages have lower priority to messages that impact the safety and operations of the roadway.

Prior to being displayed on a CMS, a traffic/driver safety campaign must be approved by the VDOT State Mobility Management Engineer. The VDOT Mobility Management Division will determine appropriate message wording that will be consistent on all CMS. The VDOT District Traffic Engineer or District Smart Traffic Center Manager shall determine message duration and applicable signs.

4.14 Test Messages

It is sometimes necessary to display messages on a CMS to assure correct operations or "burn-in" a new sign. Acceptable test messages must state "*TEST*" within at least one frame of the posted message.

4.15 VDOT Public Hearings

It is permissible to use portable CMS in advance of a public hearing related to a VDOT project. The portable CMS should be placed in the general vicinity of the project but not more than 2 miles from the project site.

5.0 Unacceptable CMS Usage

Any CMS usage not identified under Section 4.0 of these instructions is prohibited. Any questionable messages or unusual circumstances should be directed to the appropriate VDOT District Traffic Engineer or District Smart Traffic Center Manager. Further interpretation will be directed to the VDOT State Mobility Management Engineer. Although not all-inclusive, several specific improper uses of CMS in Virginia are listed below.

5.1 Advertising

Messages advertising any product, service, event or political party are prohibited. Special event messages shall be designed such that advertising is not embedded in the message.

5.2 Public Service Announcements

Messages designed to relay a public service announcement (catch phrases, greetings, jingles, general safety statements, non-VDOT public meetings, etc.) shall not be permitted on CMS. Safety campaign messages, as described in Section 4.13 and VDOT public hearings as described in Section 4.15, may be acceptable.

5.3 Routine Congestion Messages

During daily peak traffic periods, messages shall be used to advise motorists of unusual conditions (e.g., accidents, lane blockages, 10 minute delay, etc.) Generic descriptors (e.g., *CONGESTION AHEAD*) shall not be used to advise motorists of normal daily peak period traffic congestion. Specific information regarding the level of congestion is acceptable (eg. *SLOW TRAFFIC, NEXT 2 MILES*).

5.4 Contact Information

No phone numbers (other than those permitted under Section 4.6), web sites, or mailing addresses shall be displayed on CMS. This is a distraction to motorists.

Any reference to 911 and #77 is prohibited unless specifically requested by the law enforcement or dispatching agency that would answer the resulting calls.

5.5 Date/Time

Messages giving only the date and/or time are not allowed on CMS. If no message is to be displayed, the sign shall remain blank.

5.6 Static signing

A CMS shall not be used to replace a static sign.